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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ROSARIO-VASQUEZ, DENNIS	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 08/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/848,017	PETERSON, JOHN	
	Examiner	Art Unit	
	Dennis Rosario-Vasquez	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amed A 05/24/04*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-16,18-25,27-40 and 42-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-16,18-25,27-40 and 42-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 May 2001 and 24 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendment A was received on May 24, 2004 has been entered and made of record. Currently, claims 1, 3-16,18-25, 27-40, 42-48 are pending.

Drawings

2. The drawings of figures 1,5A, 6A and 6F were received on May 24, 2004. These drawings are acceptable.

Specification

3. Due to the amendment, the objection to the specification has been withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1,3-9,13,18-25,27-33,37,42-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Katayama et al. (US Patent 6,704,041 B1).

Regarding claim 1, Katayama et al. discloses a method comprising:

a) receiving a reference image (IMAGE PICKUP AREA 1 of fig. 3) and a first image (IMAGE PICKUP AREA 2 of fig. 3), the first image (IMAGE PICKUP AREA 2 of fig. 3) having a perimeter having a first shape (rectangular perimeter);

b) determining a relative position (POINT P1L of fig. 5) of the first image (IMAGE PICKUP AREA 2 of fig. 3) and the reference image (IMAGE PICKUP AREA 1 of fig. 3)

POINT P1L is used to match both images using a search area 202 of fig. 5;

c) using the first image (IMAGE PICKUP AREA 2 of fig. 3), the reference image (IMAGE PICKUP AREA 1 of fig. 3), and the relative position (POINT P1L of fig. 5) to generate a first corrected image (The image on the right side of Fig. 8B is generated from an "IMAGE COMBINATION PROCESSING UNIT" of fig. 1.) having less perspective distortion (The image on the right side of Fig. 8B is "a high-quality combined image (Katayama et al., col. 5, lines 63,64).") relative to the reference image (IMAGE PICKUP AREA 1 of fig. 3) than the first image (IMAGE PICKUP AREA 2 of fig. 3) has, the first corrected image (IMAGE PICKUP AREA 2 of fig. 3) having a perimeter having a first corrected shape different from the first shape (Trapezoidal shape on the right side of fig. 8B.);

d) using the first corrected shape (The trapezoidal shape corresponds to an output of step "S43" of fig. 16) to determine a focal length (Fig. 16, num. S44 is a focal length estimation for the focal length "f".) and rotation angles (Fig. 18, ω_{N-1} to ω_3) of a camera (Fig. 3 and Fig. 18 has a camera located at the central point or the radial lines.) associated with the first image (A rotation angle is determined for each image of the camera as mentioned in col. 10, lines 22,23.)

The focal length and rotation angles are determined using equations 13 and 14 of col. 10, lines 26 and 36 during step "S44"; and

e) projecting the first image (IMAGE PICKUP AREA 2 of fig. 3) on a surface ("cylindrical mapping conversion" at step "S46" of fig. 16 and mentioned in col. 11, line 13 and shown in fig. 23.) based on the focal length (fig. 14, num. 112) and rotation angles (fig. 18, ω_{N-1} to ω_3) of the camera (Fig. 18 has a camera located at the central point or radial lines) associated with the first image (IMAGE PICKUP AREA 2 of fig. 3 has a corresponding angle that was determined using the method of fig. 18.)

Using fig. 16, the focal length and rotation angles from step "S44" are inputted to step "S46", which generated a cylindrical image, via step "S45".

Regarding claim 3, Katayama et al. discloses the method of claim 1, further comprising:

projecting the reference image (IMAGE PICKUP AREA 1 of fig. 3) on the surface ("cylindrical mapping conversion" at step "S46" of fig. 16 and mentioned in col. 11, line 13 and shown in fig. 23.).

Note that the reference image also corresponds with the image on the left of fig. 8A that is combined with the first image on the right in fig. 8A and projected on a cylindrical surface.

Regarding claim 4, Katayama et al. discloses the method of claim 3, further comprising:

merging the projected reference image (IMAGE PICKUP AREA 1 of fig. 3) and the projected first image (IMAGE PICKUP AREA 2 of fig. 3) to form a panoramic image (fig. 24, "COMBINED IMAGE").

Both images are merged using a horizontal line that runs through each image as shown in fig. 23 to form the panoramic image of fig. 24.

Regarding claim 5, Katayama et al. discloses the method of claim 3 further comprising:

projecting a three-dimensional object (The image on the right of figure 8B is a three dimensional object as shown by the length, width, and depth of the image) onto the surface ("cylindrical mapping conversion" at step "S46" of fig. 16 and mentioned in col. 11, line 13 and shown in fig. 23.). ;

merging the projected three-dimensional object (The image on the right of figure 8B.), the reference image (IMAGE PICKUP AREA 1 of fig. 3) and the first image (IMAGE PICKUP AREA 2 of fig. 3) to form a panoramic image (fig. 24, "COMBINED IMAGE").

Note that the three-dimensional object corresponds to a third image, "IMAGE PICKUP AREA 3" which is merged with the other images to form a panoramic image of fig. 24.

Regarding claims 6,7,and 8, Katayama discloses the method of claim 1 wherein the surface is cylindrical (fig. 24), spherical ("spherical" in col. 8, line 23) and planar (fig. 22).

Claim 9 is similar to claim 1 except for requiring another image (IMAGE PICKUP AREA 3 of fig. 3) that is processed in the same way of claim 1.

Regarding claim 13, Katayama discloses the method of claim 1, wherein the rotation angles (fig. 18, ω_{N-1} to ω_3) of the camera (Fig. 18 has a camera located at the central point or radial lines) associated with the first image (IMAGE PICKUP AREA 2 of fig. 3 has a corresponding angle that was determined using the method of fig. 18.) is measured (A displacement, x_1 of fig. 18, is measured as indicated by an arrow beneath x_1 that corresponds to the rotation angles, ω_{N-1} to ω_3.) relative to rotation angles (The rotation angles, ω_{N-1} to ω_3, are equally spaced from each other to form a total angle of 360 degrees as mentioned in col. 10, lines 32,33.) of a camera (The camera of fig. 18.) associated with the reference image (IMAGE PICKUP AREA 1 of fig. 3 corresponds with an image of fig. 18 for determining the rotation angles, ω_{N-1} to ω_3.).

Claim 18 has different claim language than claim 1, but both claims are directed to the same function. Thus, claim 18 has been addressed in claim 1.

Regarding claim 19, Katayama et al. discloses the method of claim 18, further comprising:

determining a position offset ("D" of fig. 22) of the first segment (IMAGE 2 of fig. 22) of the view ("H" of fig. 22 is a view of a whole scene.) relative to the reference segment (IMAGE x of fig. 22) of the view, wherein correcting for perspective distortion (Fig. 23 shows all images aligned properly) is based on the determined position offset (The position offset is eliminated from fig. 22 to generate the image of fig. 23.).

Regarding claim 20, Katayama et al. discloses the method of claim 18 wherein the perimeter of the first image (IMAGE PICKUP AREA 2 of fig. 3 has a rectangular perimeter.) includes at least a first reference point and a second reference point (The image on the right of fig. 6B corresponds with the IMAGE PICKUP AREA 2 of fig. 3 has multiple reference points, "x".) and correcting for perspective distortion (The image on the right side of Fig. 8B is "a high-quality combined image (Katayama et al., col. 5, lines 63,64).") alters the shape of the perimeter (The image on the right of fig. 8B has a trapezoidal shape that corresponds with the image on the right of fig. 6B. Thus, the perimeter of the first image changes from a rectangular shape to a trapezoidal shape.) of the first image (IMAGE PICKUP AREA 2 of fig. 3 has a rectangular perimeter.) by moving the first reference point relative to the second reference point (The multiple points of fig. 6B are "moved" as mentioned in col. 3, line 65).

Regarding claim 21, Katayama et al. discloses the method of claim 20 wherein the first and second reference points (The image on the right of fig. 6B corresponds with the IMAGE PICKUP AREA 2 of fig. 3 has multiple reference points, "x".) are vertices (The point "x" of figure 6B are corner points of the multiple "x" points.) defined by the shape (The reference points are arranged within the perimeter of the image on the right of fig. 6B.) of the perimeter (rectangular perimeter) of the first image (IMAGE PICKUP AREA 2 of fig. 3 that corresponds to the image on the right of fig. 6B).

Regarding claim 22, Katayama et al. discloses the method of claim 21 wherein the shape of the perimeter of the first image is rectangular (addressed in claim 21) and correcting for perspective distortion (The image on the right side of Fig. 8B is "a high-quality combined image (Katayama et al., col. 5, lines 63,64).") alters the shape of the perimeter of the first image into a trapezoid (The image's shape on the right of fig. 6B is changed to a trapezoid image as shown on the right of fig. 8B.).

Regarding claim 23, Katayama et al. discloses the method of claim 1, wherein determining the focal length (Fig. 16, num. S44 is a focal length estimation.) and rotation angles (Fig. 18, ω_{N-1} to ω_3) is further based on the shape of the perimeter of the first image (The output of step "S43" is the image of fig. 8B that is inputted to the next step "S44".).

Regarding claim 24, Katayama et al. discloses the method of claim 1 wherein the perimeter (rectangular) of the first image (IMAGE PICKUP AREA 2 of fig. 3) has the same shape as the perimeter (rectangular) of the reference image (IMAGE PICKUP AREA 1 of fig. 3). Both images have a rectangular perimeter.

Claims 25,27-33,37,42-48 are respectively addressed in claims 1,3-9,13,18-24 except for the limitation of an article comprising a machine-readable medium on which are tangibly stored machine-executable instructions which is disclosed by Katayama in col. 11, lines 38-40 as a "program stored on a recording medium".

Allowable Subject Matter

6. Claims 10 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 10 and 34 are allowable because the prior art does not teach or suggest the step of "comparing the estimated shape and the actual shape of the perimeter of the corrected version of the first image".

The closest prior art, Katayama et al. (US Patent 6,704,041 B2), teaches comparing (Fig. 12, "S23") an image's data points (Fig. 12, "S22") with a predetermined threshold "Th".

The benefit of claim 10 allows alteration in the perimeter of the image to compute the rotation angle and focal length, thus the computing resources and computing time is reduced.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Katayama et al. (US Patent 6,389,179 B1) is pertinent as teaching a method of merging two images (I21 and I23) to a reference image (I22) with perspective distortion (L21 and L23) as shown in figures 7 and 8.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario-Vasquez whose telephone number is 703-305-5431. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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